

REMARKS

Reconsideration and allowance of this application are respectfully requested.

I. Summary of Non-Final Office Action

Claims 1-41 are all the claims pending in the application.

Claims 35-41 are rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter.

Claims 1, 2, 4, 6-10, 12, 14-16, 336, 38, 40 and 41 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Budnikov (US Pub. 2003/0215013; "Budnikov") in view of Park et al. (USP 5,732,386; "Park"), and in further view of Levine (USP 6,266,644; "Levine").

Claims 3, 11 and 37 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Budnikov in view of Park, in further view of Levine, as applied to claims 1, 2, 4, 6-10, 12, 14-16, 35-36, 38, 40 and 41, and in further view of Chen et al. (US Pub. 2003/0115042; "Chen").

Claims 17-22, 24-31, 33 and 34 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Budnikov in view of Park.

Claims 23 and 32 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Budnikov in view of Park as applied to claims 17-22, 24-31, 33 and 34, and in further view of Chen.

Claims 5, 13 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form.

II. Amendment Summary

Applicant amends paragraphs [117] and [123] of the specification as discussed below.

Applicant adds new claims 42 and 43 as discussed below.

No new matter is added by these amendments to the specification and new claims.

III. Analysis of Claim Rejection under 35 U.S.C. § 101

The Examiner rejects claims 35-41 because the specification recites that the computer-readable recording medium includes non-statutory *carrier waves*. As noted above, paragraph [123] on page 25 is amended to delete the “carrier waves”. Accordingly, Applicant respectfully requests withdrawal of the claim rejection in this matter.

IV. Analysis of Claim Rejection under 35 U.S.C. § 103(a)

[Claims 1 and 9]

In rejecting claim 1, the Examiner relies on three different references which are alleged to disclose the respective operations of the claimed digital encoding method.

Claim 1 reads as follows:

“A digital audio encoding method comprising:

- (a) determining a type of a window according to a characteristic of an input audio signal;
- (b) generating a complex modified discrete cosine transform (CMDCT) spectrum from the input audio signal according to the determined window type;
- (c) generating a fast Fourier transform (FFT) spectrum from the input audio signal, by using the determined window type; and
- (d) performing a psychoacoustic model analysis, by using the generated CMDCT spectrum and FFT spectrum.”

The Examiner alleges that operations (a) and (d) are disclosed by Budnikov, a primary reference, while operations (b) and (c) are disclosed by Park and Levine, respectively.

An aspect of the present application is that, in order to reduce the computation amount of a fast Fourier Transform (FFT) unit of a digital audio encoder without degrading audio quality, the psychoacoustic model analysis is performed using a complex modified discrete cosine transform (CMDCT) spectrum, where the CMDCT spectrum is generated according to a determined window type. By contrast, however, Budnikov (Fig. 6) shows that the adaptive grouping of psychoacoustic perceptual model, which is alleged to correspond to the claimed psychoacoustic model analysis, is performed on an input signal itself. Subsequently, the result of the adaptive grouping of psychoacoustic perceptual model is applied to the modified discrete cosine transform (MDCT). This operation of adaptive grouping of psychoacoustic perceptual model performed prior to the MDCT operation is no more than the teaching of the prior art as disclosed by the present application (Fig. 1), where the psychoacoustic model analysis is performed on an input signal, whether it is a frequency domain spectrum from a FFT unit or a direct input signal, before a subsequent MDCT is performed on the input signal. Thus, Budnikov fails to teach or suggest the claimed operation (d) as opposed to the Examiner's allegation.

In the meantime, the Examiner alleges that using CMDCT can reduce the complexity of encoding relying on Park (page 4, lines 12-15 of the office action). However, assuming *arguendo* that CMDCT might be suggested by the use of MDCT and modified discrete sine transform (MDST) as shown in Park, Park does not concern whether the claimed psychoacoustic model analysis is performed on the CMDCT and FFT spectrum at all.

The Examiner further appears to allege that using FFT along with CMDCT is obvious relying on Levine (page 4, lines 16-20 of the office action). Upon review of the cited part (col. 4,

lines 15-21) of Levine, this reference only refers to sequential operations of a discrete cosine transform (DCT) and FFT on a result of the DCT. Still, however, this reference does not teach or suggest that the claimed psychoacoustic model analysis is performed on the CMDCT and FFT spectrum at all. Instead, it is very much explicit that the above-explained operation (d) is distinguished from any one and a combination of the Examiner's references. Levine clarifies in col. 22, line 36 through col. 23, line 4, and Figs. 5 and 22, that the psychoacoustic modeling is simply performed on the input signal without recourse to the output of MDCT, while the psychoacoustic modeling only affects the quantization operation of the MDCT coefficients. In other words, this reference does not concern the claimed psychoacoustic model analysis by using the CMDCT and FFT spectrum as recited in claim 1.

As any one or a combination of the references fails to teach or suggest at least operation (d) of the claimed audio encoding method, Applicant respectfully submits that claim 1 would not have been rendered obvious over the references.

Corresponding apparatus claim 9 should also be patentable for the same reasoning as above.

[Claims 2 and 10]

The Examiner alleges that element 12 (Filterbank Analyzer) of Fig. 5 of Budnikov discloses a claimed operation of dividing an input signal into plural sub-bands. Subsequently, the Examiner alleges that element 24 or 54 discloses another claimed operation that determining of a window type is performed for (on) the input signal (which is) divided into sub-bands.

According to the Examiner's reading of the claim on Budnikov, however, the determining of a window type (selecting a window length) should be performed on the output of the element 12. On the contrary, however, the reference clearly illustrates in Fig. 5 that the selection of a window length is performed on the input signal itself (time domain) although the input signal goes through the entropy detector.

Thus, Applicant submits that claim 2 and corresponding apparatus claim 10 would not have been obvious over the references. Claims 2 and 10 should be also allowable at least due to their dependency.

[Claims 4 and 12]

Applicant submits that these claims should be allowable at least due to their dependency.

[Claims 6-8 and 14-16]

Applicant submits that these claims should also be allowable at least due to their dependency.

[Claims 35, 36, 38, 40 and 41]

Applicant submits that these claims should be patentable for the same reasoning in the analyses of claims 1, 2, 4, 6 and 7.

[Claims 3, 11 and 37]

Applicant submits that these claims should be allowable at least due to their dependency.

[Claims 17 and 26]

These claims represent another aspect of the present application. However, the claim scope herein is co-extensive with claim 1 at least in that the claimed psychoacoustic model analysis is performed using the CMDCT spectrum.

For the same reasoning discussed in the above claim 1 analysis, the references fail to teach or suggest the claimed audio encoding method which is characterized by performing psychoacoustic model analysis using the CMDCT spectrum. Accordingly, Applicant submits that these claims should also be patentable.

[Claims 18, 19, 27, 28]

Applicant submits that these claims should be allowable at least due to their dependency.

[Claims 20 and 29]

These claims should be allowable for the same reasoning for the claim 2 analysis in addition to their patentability due to their dependency.

[Claims 21-25 and 30-34]

Applicant submits that these claims should be allowable at least due to their dependency.

V. Additional Amendment and New Claims

As recited in the specification, one aspect of the present invention is simultaneous (at the same time) application of long and short windows to an input signal, by which long and short CMDCT spectrums are obtained. In this respect, paragraph 117 of the specification mistakenly recites “FFT” in place of “CMDCT”. Thus, Applicant amends paragraph 117 to straighten out the disclosure therein. This amendment is supported by Figs. 7 and 8 (operation 830).


In connection with this amendment to the specification, Applicant adds new claims 42 and 43 to more fully cover a feature of the present invention (i.e., the long and short CMDCT spectrums are generated by performing long and short CMDCT *at the same time*).

VI. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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